

A Model of Effective Governance for Knowledge Management: A Case Study at the U.S. Nuclear Regulatory Commission

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Abstract. Many organizations struggle to achieve an effective Knowledge Management (KM) program. One contributing reason is ineffective governance. The U.S. Nuclear Regulatory Commission possesses a robust KM Program. A major reason for NRC's success in KM is due to its system of governance which integrates KM horizontally and vertically throughout the agency, and achieves a balance of centralized KM management and decentralized KM implementation. This paper describes NRC's KM program with a focus on its system of governance, roles, and responsibilities. Examples of specific KM practices are also discussed.

1. Introduction

The United States Nuclear Regulatory Commission (NRC) has practiced the capturing, preservation, sharing, and use of organizational knowledge long before the term Knowledge Management (KM) came into common use. However, it was not until 2006 with the establishment of a formal KM program with a clear system of governance that the NRC initiated a more structured and systematic approach to KM. The primary impetus at the time was the changing demographics of NRC's workforce and the recognition that a significant percentage of NRC's highly skilled and knowledgeable workforce was poised for retirement; plus the NRC was in a rapid growth mode in which large numbers of new employees were being hired and needed to become qualified as license reviewers and inspectors. It was a high priority to capture and preserve the knowledge of our aging workforce and transfer it to others, especially to the newly hired employees.

2. NRC's Knowledge Management Program

The NRC's KM program was formally established in July 2006 with the issuance of a formal KM policy [1]. The KM policy describes the KM program, established a system of governance, and defines roles and responsibilities. KM remains a priority at the NRC and is an integrated part of the agency's five year strategic plan [2].

2.1. KM Senior Governance

A key element contributing to NRC's success in KM is its system of governance and delineated roles and responsibilities.

Senior level governance for agency-wide KM is provided by the KM Steering Committee (SC). The KMSC is co-chaired by the agency's Chief Learning Officer (CLO) and is comprised of senior executives representing each office and region within NRC. The role of

the KMSC is to set high level strategy and direction, and ensure the NRC KM Program meets the current and future needs of the agency. The KMSC meets and assesses program status on a bi-annual basis, thereby assuring KM remains a focus area.

The senior level governance includes a high level NRC executive who serves as the Senior KM Champion, and who: co-chairs the KMSC; helps overcome agency-level obstacles; and ensures strategic alignment between KM and the agency's mission priorities. The individual office and regional members of the KMSC also serve as executive-level champions for their respective office and region. In this role they help overcome office and regional-level obstacles and drive KM implementation within their respective organizations.

2.2. Roles and Responsibilities

The NRC uses a distributed model in managing and implementing the KM Program. The responsibility for managing agency-wide KM procedures, guidance, training, and infrastructure is centralized. This provides for necessary standardization, consistency and efficiency. The actual implementation of KM practices is decentralized and is achieved through a cross-office network of NRC staff comprising a KM Community of Practice (CoP). Decentralizing implementation enables tailoring of KM strategies and practices to individual offices' and regions' needs, plus enables increased innovation and experimentation of KM practices from which "best practices" can be harvested for broader use.

2.3. Agency KM Program Manager

The day to day management of the KM Program is provided by the Agency KM Program Manager who reports directly to the agency's CLO. The Agency KM Program Manager is a senior level staff person skilled in KM theory and practices and is responsible for the centralized components of the KM Program. Responsibilities include:

- Authoring and maintaining agency KM procedures and guidance.
- Acting as the community leader for the agency KM CoP.
- Maintaining and updating the agency KM Web site.
- Supporting the conduct and evaluation of KM pilot activities.
- Developing, overseeing, and conducting training on all aspects of KM.
- Conducting focus groups and other appropriate activities to determine agency KM needs.
- Communicating lessons learned in KM pilot projects and development efforts to Office and Region KM Champions for incorporation into their KM development activities.
- Leading the KM Staff Leads Workgroup.

2.4. KM Staff Leads

Implementation and coordination of the KM Program within individual NRC offices and regions is conducted by KM Staff Leads. A designated KM Staff Lead for each office and region leads and coordinates KM activities in each organization. Collectively, they form a cross-organizational network and the KM CoP. The Office and Regional KM Staff Leads are responsible for:

- Participating as members of the agency's KM CoP.

- Supporting the Office or Regional KM program and champion.
- Conducting focus groups to obtain staff input on KM needs, capabilities, and techniques.
- Sharing KM best practices within the KM CoP and communicating them within their offices and regions.
- Participating in and leading KM pilot activities to support identified priorities of their office or region.
- Providing feedback to the agency's KM Program Manager and KM CoP regarding results and lessons learned in their KM initiatives.

2.5. Managers and Supervisors

Achieving effective KM is ultimately the responsibility of every employee within the U.S. NRC, with individual managers having specific responsibility and accountability. Responsibilities of managers and supervisors include:

- Ensuring that the staff is trained on the use of common KM practices and techniques, and that the staff understands and meets the office's or region's KM expectations
- Identifying occupational priorities and critical bodies of knowledge needed to accomplish the work of their work unit.
- Identifying, developing, and implementing succession plans for key staff positions.
- Encouraging and providing resources for new or existing CoPs to develop tools for community knowledge such as written summaries of best practices and community Web sites.
- Updating and maintaining policies and procedures to ensure that the explicit knowledge embedded in them is kept current and correct.
- Identifying needed changes to existing training and qualification programs to incorporate current expert knowledge.

3. KM Methodologies

The U.S. NRC uses a broad and continuously evolving range of KM methodologies. A comprehensive discussion of all the methodologies used is beyond the scope of this paper. Therefore, discussion is limited to examples of those methodologies that have either proven especially effective, or that are considered relatively unique when compared to methods employed by other organizations.

3.1. KM Documents

The NRC began publishing a series of documents that are key references for the KM program in 2012, to preserve knowledge about events and assessments that shaped the regulatory process or a technical topic. The KM series focuses on collecting and interpreting historical information on identified topics for the benefit of future generations of U.S. NRC professionals as well as the public. Currently, the series features seven publications: 1) NUREG/KM-0001, "Three Mile Island Accident of 1979 Knowledge Management Digest," 2) NUREG/KM-0002, "The Browns Ferry Nuclear Plant Fire of 1975 Knowledge

Management Digest,” 3) NUREG/KM-0003, “Fire Protection and Fire Research Knowledge Management Digest, 2013,” 4) NUREG/KM-0004, “Fuel Behavior under Abnormal Conditions,” 5) NUREG/KM-0005, “2002 Davis-Besse Reactor Pressure Vessel Head Degradation Knowledge Management Digest,” 6) NUREG/KM-0006, “Fundamental Theory of Scientific Computer Simulation Review,” and 7) NUREG/KM-0007, “NRC Program on Knowledge Management of Liquid-Metal-Cooled Reactors” [3].

3.2. Regulatory Standards and Guides

The NRC produces regulations and regulatory guidance to provide safety, security, and safeguards standards and guidance that nuclear operators follow to meet NRC rules for the design and operation of their nuclear installations and for users of radioactive sources. The NRC staff also use regulatory guides and standard review plans to review license applications from. New standards and guides are developed when needed and existing ones are regularly reviewed and updated. NRC staff members are encouraged to embed their knowledge into regulatory guides and review plans as they identify and resolve new technical and regulatory issues, and as they acquire new knowledge from licensing and operating experience. NRC staff also capture knowledge in assisting in the development of IAEA safety standards and security guides and in taking these standards and guides into account in developing NRC requirements and guidance. This helps preserve the knowledge in an accessible, permanent, and long-lasting record ensuring that knowledge is transferred to future generations of NRC staff and regulatory counterparts around the world.

3.3. “Ask SME” and Learn

The NRC KM program launched an internal series called, “Ask SME and Learn,” in November 2013, to capture and share critical knowledge and experiences of Subject Matter Experts (SME). The sessions provide an opportunity for staff across the agency to learn directly from agency experts on a particular topic in an open forum. The sessions are video recorded and made available to staff on the agency’s intranet as a knowledge resource

3.4. Invitational Seminars/Panel Discussions

As part of knowledge transfer, former and current NRC experts are invited to participate in seminars and panel discussions to share stories of their past experience on various relevant topics to give an historical perspective to NRC’s policies, processes, and procedures, and significant past events. The sessions are video recorded and made available on the agency’s intranet to staff as a knowledge resource.

3.5. Communities of Practice

The NRC uses commercial software that enables the virtual formation and coordination of communities of practice (CoPs). Community “rooms” permit ongoing discussion threads in which members ask and answer questions of one another, and post relevant documents, thereby sharing knowledge within their respective communities. The application also has a feature that enables every NRC employee to create an individual profile in which they post information concerning their skills and experiences. These profiles are searchable by all employees, thereby enabling the ability to search for, identify, and connect with other employees who possess skills and experiences of interest.

4. Conclusions

The NRC's formal KM Program was formally initiated in 2006 and it continues to evolve to provide the critical knowledge to fulfill NRC's safety and security mission. A primary reason for its success is its system of governance that integrates KM vertically through the NRC's individual offices, and horizontally across the various NRC offices through formalized governance bodies and people networks. The distributed model for KM management and implementation provides an effective balance of centralization and decentralization. Its success is also largely due to NRC's support for and recognition of the vital role performed by NRC employees, NRC's values and principles of good regulation, and effective and sustained implementation of the KM program. Strong executive leadership involvement has also been a key success factor to maintaining a continuing focus on KM.

REFERENCES

- [1] SECY-06-0164; The NRC Knowledge Management Program; Internal NRC Policy Issue Information; (July 25, 2006).
<http://pbadupws.nrc.gov/docs/ML0615/ML061550011.html>

- [2] NRC Strategic Plan: Fiscal Years 2014-2018 (NUREG-1614, Volume 6)
<http://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr1614/v6/>

- [3] NUREG/KM Series – Publications Prepared by NRC Staff for Knowledge Management.
<http://www.nrc.gov/reading-rm/doc-collections/nuregs/knowledge/>